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*For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.*

(54) Title: THE USE OF SULFUR CONTAINING INITIATORS FOR ANIONIC POLYMERIZATION OF MONOMERS

(57) Abstract: An initiator is presented for anionically polymerizing monomers, to provide a functional head group on the polymer. A polymer having a functional head group derived from asulfur containing anionic initiator, and optionally as additional functional group resulting from the use of a functional terminating reagent, coupling agent or linking agent is also provided. A method is pre-
sented for anionically polymerizing monomers comprising the step of polymerizing the monomers with a sulfur containing anionic
initiator to provide a functional head group on the polymer. An elastomeric compound, comprising a functional polymer and filler is
also described. Also provided is a tire having decreased rolling resistance resulting from a tire component containing a vulcanizable
elastomeric compound.

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INTERNATIONAL SEARCH REPORT

International Application No.

PT/US 03/34597

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 C07F1/02 C08F36/04 C08F4/48

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
 IPC 7 C08F C07F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, CHEM ABS Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 709 408 A (BRIDGESTONE CORP) 1 May 1996 (1996-05-01) page 2, line 52 - line 55 page 12 - page 25	1-12
X	MINOURA, YUJI ET AL: "Polymerization of vinyl monomers by alkali metal-thiobenzophenone complexes" JOURNAL OF POLYMER SCIENCE, POLYMER CHEMISTRY EDITION, 8, 125-38 CODEN: JPLCAT; ISSN: 0449-296X, 1970, XP008032373 tables I,II	1-12
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- *&* document member of the same patent family

Date of the actual completion of the international search

7 October 2004

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Name and mailing address of the ISA

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INTERNATIONAL SEARCH REPORT

International Application No.

PCT/US 03/34597

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CAYE, FLORENCE ET AL: "A convenient high yield synthesis of functional methacrylates via dethioacetalization. Synthesis of methacrylate S,S-acetal derivatives as intermediates" PHOSPHORUS, SULFUR AND SILICON AND THE RELATED ELEMENTS , 143, 197-220 CODEN: PSSLEC; ISSN: 1042-6507, 1998, XP008032371 page 198 - page 199; tables 1,2	1,2
X	BOUILLON, JEAN-PHILIPPE ET AL: "Synthesis of symmetrical and unsymmetrical 2,5-bis(trialkylsilyl)furans and 2,6-bis(trialkylsilyl)-4H-pyrans from 1,4- and 1,5-bis(acylsilanes)" SYNTHESIS , (6), 843-849 CODEN: SYNTBF; ISSN: 0039-7881, 2000, XP001194434 See schemes 1 and 2 page 843 - page 844	1,2
X	ELIEL, ERNEST L. ET AL: "Protonation and methylation of conformationally fixed 2-lithio-1,3-dithianes. Some reactions of remarkable stereoselectivity" JOURNAL OF THE AMERICAN CHEMICAL SOCIETY , 93(10), 2572-3, 1971, XP001197203 page 2572	1,2
X	ABATJOGLU, ANTHONY G. ET AL: "Organosulfur chemistry. 3. NMR spectra of carbanions derived from 1,3-dithianes as related to the high stereoselectivity in their reactions with electrophiles" JOURNAL OF THE AMERICAN CHEMICAL SOCIETY , 99(25), 8262-9, 1977, XP001197204 the whole document	1,2
A	EP 1 016 674 A (BRIDGESTONE FIRESTONE INC) 5 July 2000 (2000-07-05) page 15, line 43 - line 47	1-12
A	WO 01/49695 A (CROMPTON CORP) 12 July 2001 (2001-07-12) page 1, line 4 - line 7 page 8, line 16 examples 3-5	1-12

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 03/34597

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☒ Claims Nos.: 1 and 2 (in part)
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
see FURTHER INFORMATION sheet PCT/ISA/210
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☒ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
1,2,8 and 9 (in part); 3-7 and 10-12 (in full).
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box I.2

Claims Nos.: 1 and 2 (in part)

Present claims 1 and 2 relate to an extremely large number of possible compounds and their preparation. Support within the meaning of Article 6 PCT and disclosure within the meaning of Article 5 PCT is to be found, however, for only a very small proportion of the compounds claimed. In the present case, the claims so lack support, and the application so lacks disclosure, that a meaningful search over the whole of the claimed scope is impossible. Consequently, the search has been carried out for those parts of the claims which appear to be supported and disclosed, namely those parts relating to:

- (i) the compounds of claims 1 and 2 where $X = S$ and $R =$ unsubstituted methyl or unsubstituted phenyl only, except where R is $R_2-CH_2(m)-NR_2$ as disclosed in claim 8, which is also included.
- (ii) All other parts of claims 1 and 2 that relate to where $X = O$ or NR .

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guideline C-VI, 8.5), should the problems which led to the Article 17(2) declaration be overcome.

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1,2,8 and 9 (in part)

Group 1: the subject matter of claims 1,2,8 and 9 insofar as it relates to the (de)protonated form of the formula depicted in claim 2 where $X = S$.

2. claims: 1,2,8 and 9 (in part)

the subject matter of claims 1,2,8 and 9 insofar as it relates to the (de)protonated form of the formula depicted in claim 2 where $X = O$.

3. claims: 1,2,8 and 9 (in part)

the subject matter of claims 1,2,8 and 9 insofar as it relates to the (de)protonated form of the formula depicted in claim 2 where $X = NR$.

4. claims: 3-7, and 10-12 (in part)

the subject matter of claims 3-7, and 10-12 insofar as it relates to the (de)protonated form of the formula depicted in claim 2 where $X = S$.

5. claims: 3-7, and 10-12 (in part)

the subject matter of claims 3-7, and 10-12 insofar as it relates to the (de)protonated form of the formula depicted in claim 2 where $X = O$.

6. claims: 3-7, and 10-12 (in part)

the subject matter of claims 3-7, and 10-12 insofar as it relates to the (de)protonated form of the formula depicted in claim 2 where $X = NR$.

7. claims: 13-17 (in part)

the subject matter of claims 13-17 excluding the applicable subject matter of groups 4-6 above.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

CT/US 03/34597

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